San Francisco Bay Area Network
Summary of Major Network Accomplishments and
Public Interest Highlights for FY 2006

San Francisco Bay Area Network - the San Francisco Bay Area Network (SFAN) Inventory and Monitoring (I&M) Program covers eight parks with significant natural resources in the central California region. These parks include John Muir NHS (JOMU), Pinnacles National Monument (PINN), Point Reyes National Seashore (PORE), and Golden Gate National Recreation Area (GOGA). Two parks are administered by GOGA but have their own enabling legislation, including Muir Woods National Monument (MUWO) and Fort Point National Historic Site (FOPO). The Network added two parks that were deemed to have significant natural resources including the Presidio of San Francisco (PRES; administered by GOGA) and Eugene O'Neill National Historic Site (EUON; administered by JOMU). PRES has several areas of significant natural resources (e.g. Crissy Field) and EUON is bordered by Las Trampas Regional Wilderness Park.

The SFAN is characterized by a high degree of plant endemism (Conservation International 2005) and contains "one of the highest concentrations of imperiled species in the United States" (Chaplin et al. 2000). Most of the SFAN units are part of the Central California International Biosphere Reserve (UNESCO 1995) and are part of the California Floristic Province, an area recognized by Conservation International as a hotspot of biodiversity (Myers et al. 2000). The reason for this combination of high diversity and endangerment is due to the highly localized climates and complex geology within a landscape of expanding urban areas, pollution and road construction. The Bay Area lies in one of only five Mediterranean-type climates in the world and currently home to seven million people. Its chaparral and coastal scrub are California's most threatened and least protected habitats (California Academy of the Sciences 2006).

In FY06, the Network made significant strides in developing monitoring protocols and continuing its ongoing monitoring efforts. The network received peer review comments on three protocols including the Raptor Monitoring at PINN, Water Quality Monitoring, and Freshwater Fish Assemblage Monitoring. The peer reviews were coordinated through the Pacific West Region (PWR) Inventory and Monitoring Coordinator and the Pacific Northwest Cooperative Ecosystem Studies Unit (CESU). Reviewers provided significant comments to the long-term monitoring efforts and recommended changes that are being adopted. The process led to the initiation of a Task Agreement with San Francisco State University through the California CESU to provide technical assistance on questions relating to sampling design and data analyses. Draft protocols were also completed for landbird monitoring through an agreement with PRBO – Conservation Science.

In FY06, SFAN received $751,600 from the National I&M Office, which included a $4,400 salary increase over FY05. The Water Resources Division (WRD) funded the program with $68,300. In addition to the total amount of $819,600, the budget tracked $15,250. This amount is the networks share of the regional coordinator position. The FY07 budget is expected to be the same plus an adjustment for cost of living increases.

A. Biological Inventories

Objectives for Biological Inventories:

1. Compile and evaluate existing documents, specimens, and spatial information for each park into standard NPS databases, and ensure such information is accurate.
2. Complete the documentation of 90% of vertebrate and vascular plant species in the parks through targeted field investigations and ensure that the species are accurately documented and vouchered.
3. Inventory taxa of special interest identified in the Network's Inventory Study Plan and develop spatial distribution maps and estimates of abundance or condition.
4. Complete baseline vegetation mapping for the Network.

Inventories completed in FY 2006:

Field work associated with biological inventories was largely completed by FY05. The focus of FY06 was to finalize databases, complete reports, share results, and finalize an Inventory Summary Report.

- The SFAN completed a significant 54-page report that summarizes inventory work conducted FY00-04. The report summarizes each inventory, highlights major findings, and provides an administrative record of the program. A public version of the report is posted to the network's website: http://www1.nature.nps.gov/im/units/sfan/index.cfm. The report details the following inventories supported in part or entirely by the Inventory and Monitoring Program:

Marine Ecosystem
- Coastal biological inventory
- Sub-tidal/deep water inventory
- Tidewater goby survey

Aquatic Ecosystem
- Riparian inventory at Pinnacles
- California freshwater shrimp inventory
- Wetland mapping

Terrestrial Ecosystem
- Lichen inventory
- Rare plant inventory
- Terrestrial vertebrate inventory

Terrestrial Ecosystem (cont.)
- Vascular plants - herbarium assessment
- Vascular plant field surveys
- Vegetation maps
- Landbird inventory
- Ashy Storm-petrel inventory
- Waterbird and shorebird inventory
- Bat inventory
- Salt marsh harvest mouse and Point Reyes jumping mouse inventory
- Bee inventory at JOMU and PINN
- Geomorphic survey of Strentzel Canyon
- Soil surveys at JOMU
- Weather surveys at key locations

- All inventory data collected for vertebrates and vascular plants from 2000-2005 by the SFAN were entered into the standard servicewide database (NPSpecies). The data were fully reviewed and certified for accuracy in order to complete the major goal of the biological inventory program.

- The SFAN worked in partnership with the Pacific Coast Science and Learning Center (PCSLC) to develop a series of Executive Briefings that highlight results

of some of the biological inventories conducted 2000-2005. Each briefing provides an overview of the major questions asked and findings of each inventory. The content was developed by Inventory and Monitoring staff while editing and formatting was provided through the PCSLC. The following executive briefings were drafted in FY06 and more are planned for FY07:

- Bat Inventory of Eugene O'Neill National Historic Site, John Muir National Historic Site and Point Reyes National Seashore.
- Bat Inventory of Pinnacles National Monument
- Birds at John Muir National Historical Site
- Lepidoptera Inventory at John Muir National Historical Site
- Vascular Plants at John Muir National Historical Site
- Vegetation Communities at John Muir National Historical Site
- Multi-species Vertebrate Inventory at Point Reyes National Seashore, Eugene O'Neill National Historic Site, and John Muir National Historic Site.

- A new paleontological inventory was initiated at the SFAN through special funding received from the Natural Resource Information Division to support Vincent Santucci, Chief Ranger at George Washington Memorial Parkway. Santucci has been spearheading paleontological inventories for networks throughout the country. He and his staff review the literature, scour museums, and even search private collections to document paleontological artifacts originating in the parks. In many cases they have rediscovered long-lost treasures such as fossils of a new whale species or large sections of petrified wood. The SFAN inventory began in FY06 and will be completed in FY07.

- The coastal biophysical inventory, partially funded by the I&M program at its onset, received funding from the California Department of Fish and Game to complete the inventory over the next two years. An interdisciplinary collaboration of scientists from four universities called PISCO (Partnership for Interdisciplinary Studies of Coastal Oceans) will be conducting the surveys along GOGA and PORE shorelines under a cooperative agreement with NPS. The spatial database was completed in 2005-06.

B. Vital Signs Monitoring

Objectives for Monitoring:

5. Develop and implement a long-term monitoring program in accordance with current NPS standards.
6. Maintain a comprehensive data management program and ensure that data are accessible for park managers and the scientific community.
7. Report and communicate results widely and ensure that information is integrated with park management.

Monitoring completed in FY 2006:

With the completion and approval of the Monitoring Plan, the SFAN has emphasized developing long-term monitoring protocols.

- Peer review comments were received for three draft protocols developed by the SFAN including Stream Fish Assemblages, Raptor Monitoring, and Water Quality Monitoring. Reviewers worked with the network through a cooperative agreement with the University of Washington established through the Pacific Northwest CESU. The review was coordinated by the PWR Inventory and Monitoring Coordinator. Reviewers provided critical feedback on monitoring objectives, sampling design, data management and data analyses. SFAN staff began to address comments in order to meet the rigorous scientific criteria established through the program.
- The SFAN established a cooperative agreement with San Francisco State University through the California CESU to work jointly on sampling design questions identified during the network's peer review process. Work will begin in FY07. The primary focus will be to refine the sampling methodology for raptor data at PINN. PINN has one of the highest known densities of breeding raptors in the United States and monitoring data is critical to reduce climbing activity at active nests.
- The Landbird protocol was drafted through a partnership between the SFAN with PRBO Conservation Science (PRBO). PRBO has a long history of avian research and monitoring in the region and working with the NPS. PRBO matched half of the project cost in order to test field methodologies and the sampling design. A revision of the protocol will be submitted for peer review through the Pacific Northwest CESU in FY07.
- In FY05, a selection process was drafted for prioritizing rare plants for monitoring at PORE. A draft protocol was written, and a sampling design was tested for one species: *Chorizanthe valida*. A second year of sampling during FY06 showed that the sampling methods were effective at tracking large density shifts that likely occurred because of unique weather conditions. This year, the prioritization methodology was adapted for the GOGA rare plant species. The top-ranked species are under consideration for inclusion in the Rare Plant monitoring protocol. Plans for FY07 include running the decision model on the combined data at all parks, and publishing the prioritization matrix for wider use by other agencies.
- A pilot project was initiated at PORE during FY05 to detect new occurrences and range expansion of yellow star thistle (*Centaurea solstitialis*) and other non-native plant species. Park staff were given a short training course and asked to report sightings on standard field forms. Data analyzed in FY06, reinforced that the currently proposed volunteer model of intensively trained volunteers can be effective in monitoring invasive species. In FY07, the volunteer based "Weed Watcher" program is being tested at GOGA with the help of a partnership with the Golden Gate National Parks Conservancy.

Highlights from these ongoing monitoring efforts include:

A record number of raptor species (12) and nests (58) were recorded at PINN during FY 2006. Among those reported were 10 prairie falcon nests that produced 32 fledglings. Nest records for 2 species (long-eared owls and white-tailed kites) represented the first confirmed breeding records for both species in the 20 years of the raptor monitoring project. Another exciting discovery this year was the confirmation of two active turkey vulture nests by other park staff. The finds represented the first active vulture nests at Pinnacles since 1984!

- The number of harbor seal pups counted at PORE and GOGA in 2006 (1,042) was slightly lower than the number in 2005 (1,109) and slightly lower than the normal range of variation during the past five years of monitoring. The first pup observed during this years' pupping season was documented on March 4. The lower numbers may have been due to a couple of factors. There were record rainfall events that may have caused seals to avoid hauling out during March. During March, there was precipitation on 26 of 31 days. In addition, limited coastal upwelling in 2006 resulted in reduced algal blooms and krill which is the basis of the marine food web in the region. Consequently, there may have been fewer fish requiring seals to spend more time foraging and less time at haul outs. The pup count was only slightly lower from than in previous years, but female seals may have skipped pupping this year because of less food was available. The number of seals counted during the molting season (4,709); however, was within the normal range of variation for the previous five years. Human disturbance events of note were: 1) dogs chasing seals into the water at Duxbury Reef, 2) school groups disturbing seals at Point Bonita, and 3) an increase in motorboat disturbances (38% of all disturbances) at Tomales Bay.

- Information provided by the Stream Fish Assemblages monitoring program is informing habitat restoration projects in various sites in western Marin County including the Big Lagoon project, the Banducci riparian restoration project on Redwood Creek, the Giacomini wetland restoration project in Tomales Bay, and a fish passage improvement project on Bear Valley Creek. At Big Lagoon and Banducci, monitoring data helped identify coho and steelhead trout habitats currently lacking and needing restoration. The monitoring data were also used to detect and rectify immediate problems in the project design. In one instance, monitoring staff located fish strandings at recently restored pools. Normally this would not have been a major problem, but in this instance the restoration site lacked proper riparian cover that is necessary to keep stream temperatures at a tolerable level for the fish.

The SFAN successfully leveraged resources through partnerships with a variety of organizations and volunteer efforts.

- A partnership between the SFAN and the Student Conservation Association (SCA) provided field experience for one volunteer who supported pilot work associated with Freshwater Dynamics monitoring. During his stay, he visited parks monthly to repair equipment and collect data from established flow

monitoring stations. The volunteer also made significant contributions to the standard operating procedures of the protocol and drafted an example annual report.

- A partnership between the SFAN and the Marin Conservation Corps (MCC) provided field experience and leadership training for one Americorps member to support the ongoing pinniped monitoring at PORE and GOGA. The Americorps member played a critical role in training and coordinating over 30 volunteers at both parks. Training involved two in-class training days and five field trips to survey locations. Volunteers surveyed harbor seals at ten locations at least once a week during the breeding and molting seasons (March - July) to document trends in population status, pupping success, and disturbance.

- The Stream Fish Assemblages monitoring program at SFAN is supported through a volunteer program in order to conduct sampling throughout the year. This year, volunteers gave 650 hours of their time to the program. They helped set up and check downstream migrant traps in the spring to determine smolt survival of coho salmon in creeks at GOGA and PORE.

- Fourteen volunteers contributed 367 hours to monitor spotted owls at PORE, GOGA and MUWO.

- Landbird monitoring progressed in FY06 through a partnership with PRBO Conservation Science. PRBO contributed over $59,000 toward supporting protocol development and continued monitoring of landbird populations in rare chaparral and riparian habitats throughout the network.

- A $134,000 grant received by Point Reyes National Seashore Association (PRNSA) from the California Department of Fish and Game (CDFG) continued to support ongoing monitoring efforts in FY06. Data from the monitoring efforts are of great interest to the state as part of its statewide fisheries program. A new grant from CDFG for over $149,000 will continue to support monitoring during FY07 and FY08.

- Donations received by Point Reyes National Seashore Association (PRNSA) partially support the pinniped ($1,000) and spotted owl monitoring programs ($4,000).

- The SFAN invasive plant species pilot program launched its “Weed Watcher” volunteer program in coordination with The Parks Conservancy, a long-time partner of the GOGA. The "Watchers" are volunteers who scout prioritized sub-watershed locations throughout the GOGA to survey and map the locations of 64 high-priority weed species. The “Watchers” learn to identify the priority weeds of the park, to use digital cameras and GPS units to record sightings, and then go on an excursion to look for the weeds.

The network made significant strides toward making information available for park management.

- The SFAN redesigned its website with staff support from PINN. The new design follows the standard format developed for all networks by the NPS Natural Resource Program Center. New content includes copies of reports, fact sheets, and project brochures.
- A one page update is written up each month and shared with park staff, partners, and volunteers via e-mail. The "SFAN I&M Update" provides project summaries, updates, and interesting highlights of its numerous monitoring programs. Back copies are archived on the network's website.
- The Pacific Coast Science and Learning Center (PCSLC) partnered with the SFAN to develop a four-page, color brochure of the SFAN Inventory and Monitoring Program. The brochure provides a brief history of the program, discusses the importance of long-term monitoring, lists the vital signs selected for monitoring, and provides examples of how information is integrated into management decisions.
- The SFAN partnered with the PCSLC to draft Executive Briefings of the Northern Spotted Owl and Pinniped long-term monitoring programs. The briefings are being distributed park-wide, the SFAN website, and will provide staff with an overview of the long-term monitoring effort, discuss trends, provide a local and regional context, and explain how the information can be used by park management. In FY07, briefings will be developed for additional long-term monitoring efforts.
- The SFAN submitted two articles for the bi-annual newsletter developed by the PCSLC. The articles promoted the volunteer "Weed Watchers" program to search for invasive plant species and highlighted results of the 20-year raptor monitoring program at PINN.
- Park staff, and the Pacific Coast Science and Learning Center teamed up with the SFAN to host a Science Communication Workshop that was funded through the Pacific West Region Training Program. The workshop, entitled "Sharing with each other and sharing with the public" was well attended by staff from network parks and partner organizations. In addition to the many participants, there was a long wait list suggesting a demand for this type of workshop throughout the service. Instructors included scientists and interpreters from throughout the region including the Natural Resource Program Center - Office of Education and Outreach. The workshop highlighted effective communication strategies and provided an opportunity for participants to develop new and more effective communication strategies that could be implemented in their parks.
- With support from the GOGA Public Affairs Specialist, three legislative briefings were drafted about the SFAN Inventory and Monitoring Program. The briefings will be used to provide background information about the network to many of the legislators who visit the park each year.

- In partnership with the University of California – Davis, the SFAN is piloting a Vital Signs Report Card. The goal of the report card is to inform non-scientists about the status and trends of our complex ecosystems. The principal investigator is synthesizing coho salmon data collected at PORE and GOGA over the last nine years. If drafts have favorable reviews, the program may be expanded to report the status of other vital signs in FY07.

Data management continued to be a high priority for the monitoring program. In FY06, network data managers provided several training opportunities for park staff to ensure standard data management practices are applied network wide.

- Datamanagers from the SFAN and Pacific Coast Science and Learning Center teamed up to host a workshop for network and park staff on the use of standard data management practices. The workshop focused on metadata development using new tools developed by the Natural Resource Program Center, including the Natural Resource Database Template, Dataset Catalog, NPS Metadata Tools & Editor, and the NR-GIS Data Store and Server.

- The SFAN data management staff coordinated data entry, error checking, and converted 5 years of harbor seal data from old databases to the standard Inventory and Monitoring Program Database (Natural Resource Database Template). The dataset will complement I&M long-term monitoring data collected at GOGA.

The network has made significant contributions toward meeting objectives of the Director's Legacy Initiative.

- The SFAN continued biological inventories and developing the monitoring program, as directed through the Natural Resource Challenge.

- New agreements with the California Cooperative Ecosystem Studies Unit (CESU) will help SFAN meet its science and research needs. One project was established to develop a pilot vital signs report card. Another project was developed to enhance the programs statistically valid sampling designs and analytical techniques.

- A strategic planning effort was initiated in FY2006 by the SFAN to ensure a financially sustainable program over the next 5-10 years. The planning effort included a core operations analysis. Discussions focused on funding core monitoring projects over the long term and on improving efficiencies for each protocol. The planning effort is leading toward more focused field data collection and sharing resources among monitoring projects. Streamwater flow data, for example, can be easily collected during Freshwater Quality monitoring efforts.

- All network staff participated in the SFAN Servicewide Safety Stand Down. Key safety issues relating to daily operations of vital signs monitoring were identified. The result was heightened awareness among staff about safety issues and a

handbook that will be updated continuously with safety information. Job hazard analyses were developed for several monitoring activities in the network.

- Staff of the SFAN has begun discussions with neighboring land management agencies and invasive species-related organizations (Audubon Canyon Ranch, California Invasive Plant Council, US Fish and Wildlife Service, Sonoma Ecology Center, Bay Area Openspace Council, and Bay Area Weed Management Areas) to develop a Bay Area region-wide Early Detection Network for invasive species. This effort will build on and enhance the early detection monitoring protocol being developed by the network.

- Staff of the SFAN participated in a variety of training programs in order to support professional development opportunities, retain staff, and improve decision-making. Training included first aid, data management, program management, leadership, and supervision.

The SFAN also drafted changes to its charter.

- Key changes include a clarification of the process for developing the Annual Administrative Report and Workplan. The development of the report and workplan has been greatly streamlined and will be completed earlier in the year than during previous years. The first draft will be presented to the Technical Steering Committee by 1 Sept. The revised draft will then be presented to the Board of Directors by Sept. 25 for review. The board, including the regional I&M coordinator, will review, discuss, and submit changes to the coordinator by 25 October. The final document is due to the regional I&M coordinator by 31 Oct.

C. Water Quality Monitoring

Objective for Water Quality Monitoring:

8. Develop and implement a long-term water quality monitoring program.

Water Quality Monitoring completed in FY 2006:

The Freshwater Quality Monitoring Protocol was completed and formally peer-reviewed. The protocol provides the guidance for monitoring the health of park streams by tracking pH, temperature, conductance, and dissolved oxygen, as well as bacterial, nutrient and sediment levels. A technician was hired in January 2006 to address monitoring protocol peer review comments, make adjustments to the protocol narrative and SOPs, and to begin the project implementation.

- A poster presentation of the water quality monitoring protocol was given by the staff of SFAN at the National Water Quality Monitoring Conference, San Jose, CA, May 2006. The presentation included an overview of the I&M program and a detailed presentation about water quality monitoring.

- Staff from the SFAN teamed up with the Water Resource Division and hosted a training session for park staff and partners working on water quality monitoring. The goal of this training was to encourage park staff collecting water quality monitoring data to 1. document their methods, 2. use this database, and 3. catalog all network park water quality data in a single repository, NPSTORET. NPSTORET is a desktop MS Access database which was developed by the NPS Water Resources Division as a tool for uploading water quality data into the national Environmental Protection Agency (EPA) STORET (short for STOrage and RETrieval) online data warehouse. In addition to the STORET upload feature, NPSTORET is a capable desktop database with functions for data summarization which include the creation of tabular and graphical reports. NPSTORET can also import data from a variety of file formats (i.e. MSAccess, Excel, ASCII) as well as archived data from the Environmental Protection Agency (EPA) EPA STORET and the United States Geological Survey – National Water Information System (NWIS) database.